

Exhibit 8

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OHIO
EASTERN DIVISION

IN RE NATIONAL	:	MDL No. 2804
PRESCRIPTION OPIATE	:	CASE NO. 17-MD-2804
LITIGATION	:	(DAP)
	:	

EXPERT REPORT OF CRAIG J. MCCANN, PH.D., CFA
March 25, 2019

- d. “NDC Dictionary Instructions,” Drug Enforcement Administration, October 2010 (current version available at www.deadiversion.usdoj.gov/arcos/ndc/readme.txt);
- e. “NDC/NHRIC Labeler Codes,” U.S. Food & Drug Administration, January 2018 (current version available at www.fda.gov/ForIndustry/DataStandards/StructuredProductLabeling/ucm191017.htm);
- f. “Opioid Oral Morphine Milligram Equivalent (MME) Conversion Factors,” Centers for Disease Control and Prevention, August 2017 (current version available at www.cdc.gov/drugoverdose/resources/data.html);
- g. “Full Replacement Monthly NPI File,” Centers for Medicare and Medicaid Services, November 2018 (current version available at download.cms.gov/nppes/NPI_Files.html);
- h. ARCOS Registrant Handbook, Drug Enforcement Administration, August 1997 (current version available at www.deadiversion.usdoj.gov/arcos/handbook/full.pdf);
- i. *Masters Pharmaceutical, Inc. v. Drug Enforcement Administration*, 861 F.3d 206 (D.C. Cir. 2017);
- j. U.S. Dep’t of Justice, DEA, *Chemical Handler’s Manual: A Guide to Chemical Control Regulations* (2004), (WAGMDL00395965);
- k. U.S. Dep’t of Justice, DEA, *Diversion Investigators Manual* (1990)(CAH_MDL_PRIORPROD_DEA07_01176247);

l. U.S. Dep't of Justice, DEA, Diversion Investigators Manual (1996) (CAH_MDL2804_02203353);

m. Other documents cited in the text and footnotes below.

III. Assignment

10. I have been asked by Plaintiffs' Counsel to document how I processed, validated and augmented opioid transaction data produced by the Drug Enforcement Administration ("DEA") and from the Defendants.

11. I have been asked to summarize shipments in the ARCOS Data, especially those shipments into Cuyahoga County and Summit County.

12. I have also been asked to report the results of applying certain algorithms to the ARCOS Data.

IV. Summary of Opinions

13. Based upon my comparison of the ARCOS Data produced by the DEA and the public ARCOS Retail Drug Summary Reports, I conclude that, after correcting a relatively small number of records, the ARCOS Data produced by the DEA is reliable.

14. I conclude that the ARCOS Data is reliable because it closely matches the DEA's Retail Drug Summary Reports for January 2006 through December 2014. Retail Drug Summary Reports summarize the weight of drugs in reported transactions with consumers in each of the 50 states and the District of Columbia. Where there were discrepancies between the ARCOS Data produced by the DEA and the Retail Drug Summary Reports, I was able

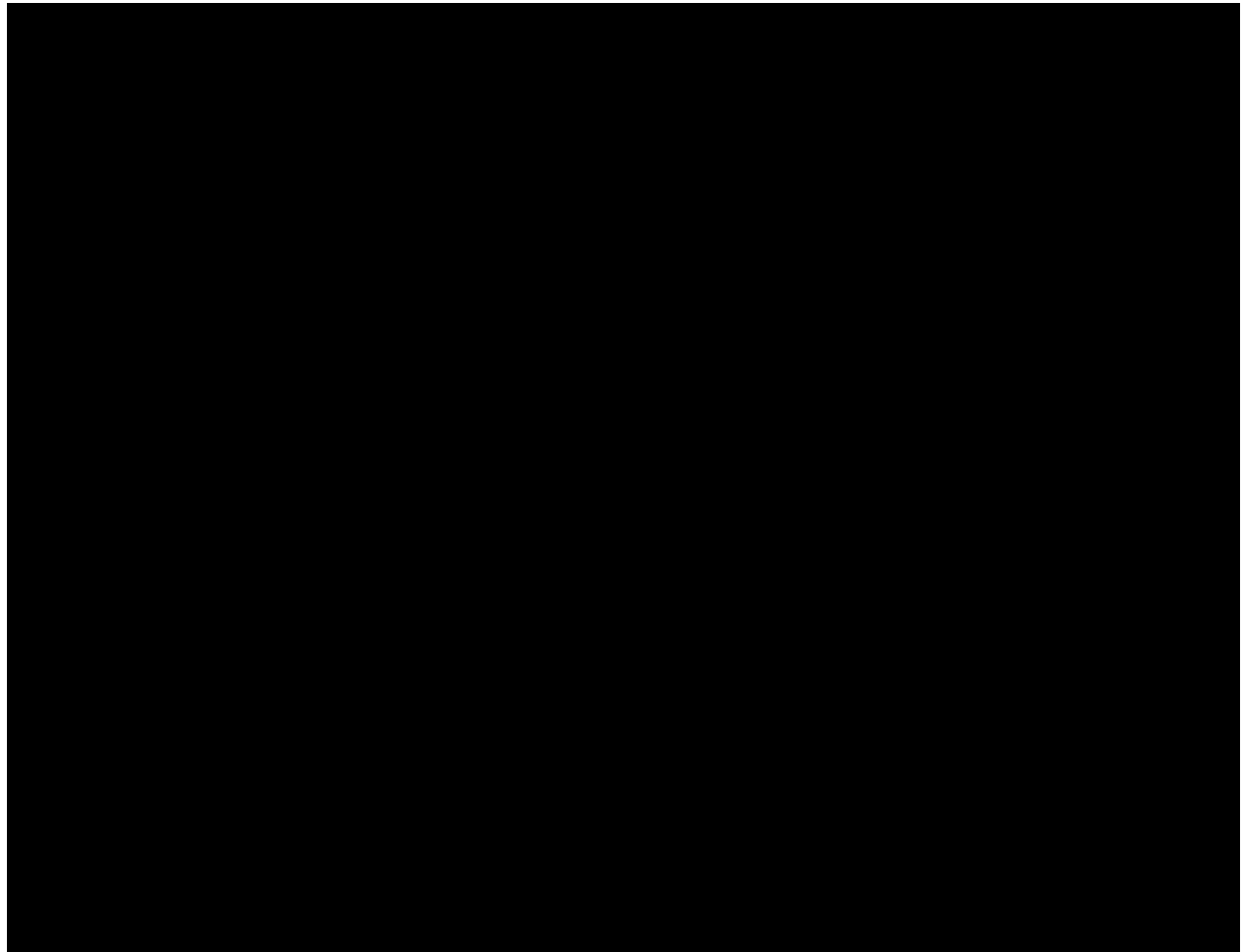
to identify and correct the error in either the ARCOS Data or the Retail Drug Summary Reports.

15. The ARCOS Data produced by the DEA also closely matches transaction data produced in discovery by Cardinal Health, McKesson Corp, Walgreens, CVS, Anda, H.D. Smith, Walmart, HBC, Discount Drug Mart, and Prescription Supply from their business records. I expect the data produced in discovery by the Defendants to be accurate. As with the Retail Drug Summary Reports, I have been able to identify and correct relatively minor discrepancies between the ARCOS Data produced by the DEA for transactions in Cuyahoga County and Summit Counties in Ohio from January 2006 through December 2014 and the Defendants' transaction data.

16. The data on opioid shipments from January 2006 through December 2014 produced in discovery by AmerisourceBergen does differ from what AmerisourceBergen reported to the DEA as reflected in the ARCOS Data.

17. I conclude from my review of the ARCOS Data, the Retail Drug Summary Reports, and transaction data produced in discovery by the Defendants that the ARCOS Data is reliable. Based on this analysis, I further conclude that the transaction records produced in discovery by the Defendants other than AmerisourceBergen are a reliable source of transactions data before 2006 and after 2014 for the varied time periods covered by the Defendants' productions.

18. In the next section, I describe the ARCOS Data produced by the DEA and report national summary statistics for the ARCOS Data, after correcting minimal errors explained fully in Appendix 2. In Section VI, I



B. ARCOS Data Fields Produced by DEA

27. The ARCOS Data produced by the DEA has the 34 fields illustrated in Figure 1 for each transaction record. Twelve of the 34 fields are submitted with each transaction record by the Reporting Registrant, the DEA registered entity reporting the opioid shipment through ARCOS. These twelve fields are defined in the ARCOS Handbook.³ The remaining 22 fields were appended by the DEA to the transaction records submitted by the Reporting

³ “ARCOS Registrant Handbook,” Drug Enforcement Administration, August 1997 (“ARCOS Handbook”). Current version available at www.deadiversion.usdoj.gov/arcos/handbook/full.pdf.

Registrant.⁴ Eighteen of the 22 fields are information about the Reporting Registrant and the Associate Registrant, keyed off their DEA numbers.⁵ Three of the remaining four fields are either taken from the NDC (for National Drug Code) Dictionary or are calculated using variables therein and appear to have been imported by the DEA into the data it produced by matching each transaction's NDC number with the NDC number in the NDC Dictionary.⁶

Figure 1 ARCOS Data Fields Produced by DEA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Reporter / Seller Info										Buyer Info										Transaction Info													
DEA #	Business Activity	Name	Addl Co Info	Address1	Address2	City	State	Zip	County	DEA #	Business Activity	Name	Addl Co Info	Address1	Address2	City	State	Zip	County	Transaction Code	Drug Code	NDC Number	Drug Name	Quantity	Unit	Action Indicator	Order Form Number	Correction Number	Strength	Transaction Date	Calc Base Weight Grams	Dosage Unit	Transaction Id

28. The first 10 fields provide information on the Reporting Registrant. The DEA identified these Reporter DEA numbers and associated fields as “Seller” fields and so, unless the context requires otherwise, I refer to the Reporting Registrant as the “Seller” and the associated fields as “Seller” fields. This information includes a Seller’s DEA Number, a description of the

⁴ The 22 fields are Reporter Business Activity, Reporter Name (2 fields), Reporter Address (6 fields), Buyer Business Activity, Buyer Name (2 fields), and Buyer Address (6 fields), Drug Code, Drug Name, Calculated Base Weight in Grams, and Dosage Unit.

⁵ The 18 fields are Reporter Business Activity, Reporter Name (2 fields), Reporter Address (6 fields), Buyer Business Activity, Buyer Name (2 fields), and Buyer Address (6 fields).

⁶ Drug Code and Drug Name are both in the NDC Dictionary. Calculated Base Weight in Grams is calculated using Ingredient Base Weight in the NDC Dictionary and Quantity, Unit, and Strength in the ARCOS Data.

Seller's Business Activity (primarily Manufacturer, Distributor or Reverse Distributor), Name and Address (6 fields).

29. The next 10 fields provide information on the Associate Registrant, typically a receiver of the opioid shipment.⁷ The DEA identified the Associate Registrant DEA numbers and associated fields as "Buyer" fields and so, unless the context requires otherwise, I refer to the Associate Registrant as the "Buyer" and the associated fields as "Buyer" fields. This information includes the Buyer's DEA Number, a description of the Buyer's Business Activity (primarily Distributor or Retail or Chain Pharmacy), Name and Address (6 fields).

30. The final 14 fields provide information about the transaction. This information includes Drug Name and Drug Code (e.g. 9143 for oxycodone products), NDC Number, Quantity, Unit, Strength, Dosage Unit, Calculated Base Weight in Grams, Transaction Code (e.g., whether the transaction was a Purchase or a Sale), Transaction Date, Transaction Identifier, Correction Number, Action Indicator, and Order Form Number.

1. Seller DEA Number

31. The ARCOS Data produced by the DEA includes [REDACTED] distinct Seller DEA Numbers. Manufacturers and distributors typically have more than one DEA number as each facility manufacturing or distributing controlled substances must have its own DEA number.⁸

⁷ See, ARCOS Handbook at pp. 5-36 – 5-37.

⁸ See, ARCOS Handbook at 1-5.

2. *Seller Business Activity*

32. The ARCOS Data lists one “Business Activity” for each Seller DEA Number. There are six distinct Seller Business Activities in the ARCOS Data: Manufacturer, Manufacturer (Bulk), Chemical Manufacturer, Distributor, Chempack/SNS Distributor, and Reverse Distributor.

3. *Seller Name and Address*

33. The ARCOS Data provides a business address for each Seller DEA Number, but there is not a one-to-one mapping between the addresses and the Seller DEA Numbers. Some Seller DEA Numbers are associated with multiple addresses, and some addresses are associated with more than one contemporaneous Seller DEA Number. Multiple Seller DEA Numbers can also be associated with the same address over time as locations are occupied by businesses newly registered with the DEA.

4. *Buyer DEA Number*

34. The ARCOS Data includes [REDACTED] distinct Buyer DEA Numbers. [REDACTED] DEA numbers are listed as both Sellers and Buyers, although not in the same transaction.

5. *Buyer Business Activity*

35. The ARCOS Data includes 54 distinct Buyer Business Activities including Manufacturer, Distributor, Reverse Distributor, Analytical Lab, Retail Pharmacy, Chain Pharmacy, Mail Order Pharmacy and Hospital/Clinic. Some Buyer DEA Numbers have more than one Buyer Business Activity.

6. *Buyer Name and Address*

36. The ARCOS Data provides a business address for each Buyer DEA Number, but there is not a one-to-one mapping between the addresses and the Buyer DEA Numbers. Some Buyer DEA Numbers are associated with

Appendix 6: List of Reporter Company Families

Seller Family	Seller Name	Seller DEA Number
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG	RA0322824
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG	RA0326276
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	PL0032627
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0129937
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0210409
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0223432
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289000
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289036
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289048
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289050
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289062
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289074
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289086
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289098
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289276
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289288
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0289492
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290522
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290724
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290736
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290837
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290938
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0290988
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0291168
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0291170
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0310603
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0314562
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RA0363301
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RB0363630
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP	RE0161733
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORP.	RA0336924
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORPORATION	RA0316958
AmerisourceBergen Drug	AMERISOURCEBERGEN DRUG CORPORATION	RA0464406
Anda, Inc	ANDA PHARMACEUTICALS INC	RA0287020

Seller Family	Seller Name	Seller DEA Number
Anda, Inc	ANDA PUERTO RICO, INC.	RA0394748
Anda, Inc	ANDA, INC	RA0180733
Cardinal Health	CARDINAL HEALTH	RC0182080
Cardinal Health	CARDINAL HEALTH	RC0221236
Cardinal Health	CARDINAL HEALTH	RC0229965
Cardinal Health	CARDINAL HEALTH	RC0238104
Cardinal Health	CARDINAL HEALTH	RC0271267
Cardinal Health	CARDINAL HEALTH	RC0311693
Cardinal Health	CARDINAL HEALTH	RC0313940
Cardinal Health	CARDINAL HEALTH	RC0314891
Cardinal Health	CARDINAL HEALTH	RC0333524
Cardinal Health	CARDINAL HEALTH	RC0341153
Cardinal Health	CARDINAL HEALTH	RC0346658
Cardinal Health	CARDINAL HEALTH	RC0403802
Cardinal Health	CARDINAL HEALTH	RD0108200
Cardinal Health	CARDINAL HEALTH	RN0209583
Cardinal Health	CARDINAL HEALTH	RN0231427
Cardinal Health	CARDINAL HEALTH	RN0281054
Cardinal Health	CARDINAL HEALTH	RO0153609
Cardinal Health	CARDINAL HEALTH	RW0191407
Cardinal Health	CARDINAL HEALTH	RW0191419
Cardinal Health	CARDINAL HEALTH	RW0191813
Cardinal Health	CARDINAL HEALTH	RW0191926
Cardinal Health	CARDINAL HEALTH	RW0216449
Cardinal Health	CARDINAL HEALTH	RW0231908
Cardinal Health	CARDINAL HEALTH	RW0234928
Cardinal Health	CARDINAL HEALTH	RW0236009
Cardinal Health	CARDINAL HEALTH	RW0243725
Cardinal Health	CARDINAL HEALTH	RW0243903
Cardinal Health	CARDINAL HEALTH	RW0263056
Cardinal Health	CARDINAL HEALTH	RW0263549
Cardinal Health	CARDINAL HEALTH	RW0269654
Cardinal Health	CARDINAL HEALTH	RW0279996
Cardinal Health	CARDINAL HEALTH	RW0283452
Cardinal Health	CARDINAL HEALTH 110	PT0186038
Cardinal Health	CARDINAL HEALTH 110, LLC	PC0003044
Cardinal Health	CARDINAL HEALTH 110, LLC	RK0416900

Seller Family	Seller Name	Seller DEA Number
Cardinal Health	CARDINAL HEALTH 110, LLC	RP0337370
Cardinal Health	CARDINAL HEALTH P.R. 120, INC.	RB0374683
Cardinal Health	CARDINAL HEALTH, INC.	RW0286333
CVS	CVS INDIANA	RH0197170
CVS	CVS ORLANDO FL DISTRIBUTION	RC0318128
CVS	CVS PHARMACY INC	PM0124723
CVS	CVS PHARMACY INC	RC0347725
CVS	CVS PHARMACY, INC	RC0275467
CVS	CVS PHARMACY, INC.	RC0315108
CVS	CVS PHARMACY, INC.	RM0145347
CVS	CVS RX SERVICES, INC	RC0415871
CVS	CVS TN DISTRIBUTION, LLC	PR0205559
CVS	CVS VERO FL DISTRIBUTION, L.L.C	RC0338031
CVS	CVS VERO FL DISTRIBUTION, L.L.C.	RC0469292
Discount Drug Mart	DISCOUNT DRUG MART	PD0203377
H. D. Smith	H D SMITH WHOLESALE DRUG CO	PH0035964
H. D. Smith	H D SMITH WHOLESALE DRUG CO	RB0268486
H. D. Smith	H D SMITH WHOLESALE DRUG CO	RH0225056
H. D. Smith	H D SMITH WHOLESALE DRUG CO	RS0269236
H. D. Smith	H D SMITH WHOLESALE DRUG CO.	RH0323775
H. D. Smith	H D SMITH WHOLESALE DRUG COMPANY	RH0366460
H. D. Smith	H. D. SMITH	RH0340896
H. D. Smith	H. D. SMITH	RH0344781
H. D. Smith	H. D. SMITH WHOLESALE DRUG	RH0347282
H. D. Smith	HD SMITH TEXAS DIVISION	PT0027296
H. D. Smith	SMITH MEDICAL PARTNERS LLC	RS0375344
HBC Service Company	HBC SERVICE COMPANY	RH0389773
Henry Schein Inc	HENRY SCHEIN ANIMAL HEALTH	RB0393912
Henry Schein Inc	HENRY SCHEIN ANIMAL HEALTH	RB0394938
Henry Schein Inc	HENRY SCHEIN ANIMAL HEALTH	RB0394940
Henry Schein Inc	HENRY SCHEIN ANIMAL HEALTH	RB0395219
Henry Schein Inc	HENRY SCHEIN INC	RH0162494
Henry Schein Inc	HENRY SCHEIN INC	RH0181709
Henry Schein Inc	HENRY SCHEIN INC	RH0284199
Henry Schein Inc	HENRY SCHEIN, INC	RH0236667
Henry Schein Inc	HENRY SCHEIN, INC	RH0238192
McKesson Corporation	MCKESSON BIO SERVICES	

Seller Family	Seller Name	Seller DEA Number
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
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McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON CORPORATION	
McKesson Corporation	MCKESSON DRUG COMPANY	
McKesson Corporation	MCKESSON MEDICAL SURGICAL INC	

Seller Family	Seller Name	Seller DEA Number
McKesson Corporation	MCKESSON MEDICAL-SURGICAL INC	RG0223937
McKesson Corporation	MCKESSON PACKAGING SERVICES	RM0306541
McKesson Corporation	MCKESSON SPECIALTY CARE DISTRIBUTION CORPORATION	RO0338889
McKesson Corporation	MCKESSON SPECIALTY DIST LLC	RM0339831
McKesson Corporation	MCKESSON SPECIALTY DISTRIBUTION, LLC	RM0291207
McKesson Corporation	MCKESSON SPECIALTY LOGISTICS	RM0301515
McKesson Corporation	MCKESSON TRADING COMPANY	RM0212857
McKesson Corporation	RX PAK DIV OF MCKESSON CORP	RR0276837
McKesson Corporation	WATSON PHARMA INC	RS0104517
Prescription Supply Inc	PRESCRIPTION SUPPLY INC	PP0031904
Rite Aid	RITE AID DAYVILLE DISTRIBUTION CENTER	RR0355277
Rite Aid	RITE AID MID-ATLANTIC	RR0236073
Walgreen Co	WALGREEN ARIZONA DRUG CO	PW0221084
Walgreen Co	WALGREEN CO	PW0122262
Walgreen Co	WALGREEN CO	PW0211158
Walgreen Co	WALGREEN CO	RW0152467
Walgreen Co	WALGREEN CO	RW0204026
Walgreen Co	WALGREEN CO	RW0277752
Walgreen Co	WALGREEN CO	RW0281953
Walgreen Co	WALGREEN CO	RW0294493
Walgreen Co	WALGREEN CO	RW0308216
Walgreen Co	WALGREEN CO.	RW0340757
Walgreen Co	WALGREEN CO.	RW0347496
Walgreen Co	WALGREEN EASTERN CO INC	RW0161872
Walgreen Co	WALGREEN EASTERN CO., INC.	RW0376170
Wal-Mart	WAL-MART PHARM WAREHOUSE #1	PW0186785
Wal-Mart	WAL-MART PHARMACY WAREHOUSE	RW0133479
Wal-Mart	WAL-MART PHARMACY WAREHOUSE	RW0165731
Wal-Mart	WAL-MART PHARMACY WHSE #45	RW0282145
Wal-Mart	WAL-MART PHCY WAREHOUSE #46	RW0199908
Wal-Mart	WAL-MART WAREHOUSE #32	RW0186278